Tanta University

Department: **Computers and Control Engineering**

Faculty of Engineering

Course Title: **Compilers and Languages** (First term)

Course Code: CCE3113 3rd year
Allowed time: 15 minutes

Student Name:

Section No.:

Quiz2

(10 marks)

1 Consider the context free grammar

$S \rightarrow SS+ \mid SS* \mid a$

a) Show how the string aa+a* can be generated by this grammar.

b) Construct a parse tree for this string.

c) What language is generated by this grammar? Justify your answer.

2. Which of the grammars are ambiguous?

a) $S \rightarrow 0S1 \mid 01$

b) $S \rightarrow +SS \mid -SS \mid a$

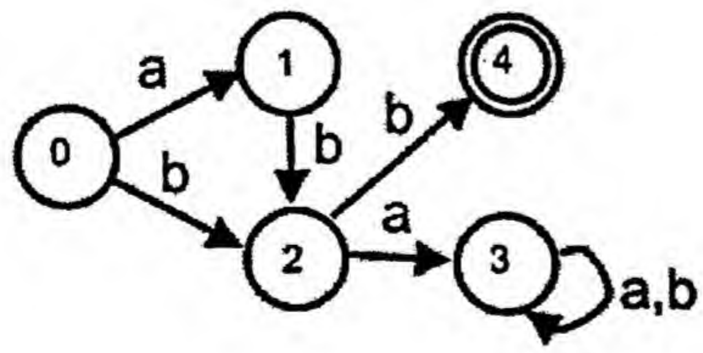
c) $S \rightarrow S\ (S)\ S \mid \varepsilon$

d) $S \rightarrow a\ S\ b\ S \mid b\ S\ a\ S \mid \varepsilon$

e) $S \rightarrow a \mid S + S \mid S\ S \mid S\ * \mid (\ S\ )$

3. Consider the alphabet Σ = {a; b}. Define the shortest, regular expression that generates strings over Σ that contain exactly one "a" and at least one "b".

4. Given the Finite Automaton below with initial state 0 and alphabet {a,b} answer the following questions:



(a) Why is this FA a Non-Deterministic Finite Automaton (NFA)?
(b) Convert this NFA to a DFA using the closure computation.
(c) What is the Regular Expression matched by this NFA?

Dr. Sherin El Gokhy
Best wishes